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ABSTRACT

This program is the third in the Science Safari series produced by the Fairfax Network of the Fairfax County (Virginia) Public Schools. It focuses on animals and plants that are native to the continent of North America and highlights the importance of species interdependence. The aim of this program is to provide students with the knowledge necessary to make informed decisions and instill the desire to become involved in issues affecting their planet. This document contains background information, activities, and a list of resources. (JRH)

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Fairfax County Public Schools

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Home On The Range

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"Home On The Range"

is the third program in the
Science Safari series, a production of
the Fairfax Network of the
Fairfax County Public Schools

in cooperation with:

Smithsonian Institution
National Zoological Park
NOAHS Center
Conservation and Research Center
(Front Royal, VA)

with assistance from:
British Airways
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In our third **Science Safari** program, we move from hoofed animals across the world to animals and plants that are native to the continent of North America. The variety of animals living on our continent is astonishing, and students will be amazed at the number and diversity of these special creatures. Once again, we will meet the animals and people of the Smithsonian Institution's National Zoological Park and its Conservation and Research Center. Since the park's earliest days, its mission has been the study and preservation of our nation's animals. Respect for our land and the plants and animals that live here is vital if we expect children to take the lead making Earth a place where humans and other species can survive and thrive. Throughout the program, we will focus on the importance of species interdependence. It is important for young people to understand this concept, since the slightest change in habitat or the number or viability of species can have a profound effect on the planet's ecosystem. In "Home on the Range" we hope to provide your students with the knowledge necessary to make informed decisions and instill the desire to become involved in issues affecting their planet. Our journey into the animal world moves closer to home in our third program. We're glad you and your students are joining us!

PREVIEWING ACTIVIITIES

The following activities will help prepare students for "Home on the Range."

1. Direct students to participate in a brainstorming session to compile a list of animals that they think are native to the continent of North America. Then ask students to put the animals into different categories. (Possible categories include: birds, fish, mammals, reptiles, amphibians, insects, animals that fly, animals that are four-legged, animals that live in deserts, animals that live in forests, animals that live in the water, small animals, large animals, carnivores, herbivores, omnivores, animals that migrate, animals that hibernate.)

2. Ask students to select a native North American animal to research. Direct students to collect the information in a journal or log. Students may include, in the journal, sketches or pictures clipped from magazines, as well as personal observations, thoughts, and feelings they have about the animal. Students' questions about the animal should also be a part of the journal.

3. After students research their North American animals, you may want to ask each student to write a story about what a day in the life of his or her chosen animal would be like. (Some examples for the students to use as models are books by Tejima, the Long Pond books by William and Lindsay George, books by Jean Craighead George, and books by Jim Arnosky.)

4. The existence of many animals that live in North America is threatened for a number of reasons. Direct students to participate in a brainstorming activity to create a list of causes for animal extinction. Research some of the endangered animals. (Some examples are the whooping crane, the black-footed ferret, the Florida panther or puma, and the bald eagle. The September 1994 issue of *Life* magazine has an article and photographs of America's top 100 endangered plants and animals.)

5. You may want to introduce a North American animal as a "North American Animal of the Day." Introduce the animal by informing students of the animal's appearance, its habitat, what it eats, what its home looks like, and any other interesting information. Ask students to take notes daily.

6. Play "What Animal Am I?" with your students. Select a North American animal and give clues about the animal. Ask students to guess the animal using as few clues as possible. (Example: I live in the west, the southwest, and in Florida in the United States. I am a carnivore. I live in high places. I am a mammal. I am a member of the cat family. I am rare today. I live alone. Who am I? Answer: a puma.) You might want to ask a student to give clues to see if he or she can stump classmates.

7. Students may not be aware of the number of species that live on the continent of North America that are not native species (examples are honeybee, pheasant, and zebra mussel). Ask students to investigate nonnative species and the effect they have had on the continent. Questions to consider are: How does this animal affect native species? How has this animal affected the habitat in which it lives? Where, when, and how was this animal introduced to North America?

8. Direct students to compile a "life list" of the different animals they see for one week. Ask students to consider the following questions: How many animals were native? How many animals were nonnative? Where did the students see the greatest number of different kinds of animals?

Introduction to the CURRICULUM GUIDE

In the 1700s, herds of American buffalo blanketed the Great Plains. The American Indian tribes who lived on the Plains made clothing from the buffaloes' hides, fashioned tools and weapons from their bones, and cooked buffalo meat to feed their families. If your classroom could magically travel back in time back to the Great Plains of two hundred years ago, the picture before you would be much different from the one you see today.

The American buffalo, or bison, is one example of a species native to North America whose populations have decreased dramatically over the past two hundred years. In many places where animals like the buffalo, black-footed ferret, puma, and wolf once ranged, cities, towns, farms, and streets now exist. The landscape has changed and in many places these species have been forced into small pockets of land. Some are threatened by extinction in areas where they used to be abundant.

Certain North American plants were discovered by American Indian tribes to have healing properties. Doctors and scientists are closely examining this ancient knowledge and crediting it to Native American discovers.

The activities presented here attempt to illustrate, by focusing on animals and plants indigenous to North America, how scientists are trying to better understand species and their environments. We invite you and your students to be part of these discoveries in your classroom. Enjoy!

VOCABULARY

adaptation	a quality or characteristic of a species that allows it to adjust to an environment; having webbed feet is an adaptation that allows ducks to paddle in water
alpha female	the dominant female in a wolf pack
alpha male	the dominant male in a wolf pack
arthritis	a condition in which the joints in the body (such as elbows and knees) swell
asthma	the condition of shortness of breath that may be due to allergies, exercise, and stress
behavior	actions under certain circumstances; fear is the behavior shown by a deer being hunted by wolves
biopark	the name for a new kind of zoo that recreates animals' and plants' natural environment
breed	to produce offspring
buck	an adult male deer
burrow	a hole in which to live that an animal (such as a prairie dog) digs in the ground
camouflage	an adaptation that allows a living thing to blend visually into its natural surroundings
canine distemper	a disease that affects canines (dogs), foxes, and ferrets; causes an animal to have difficulty breathing and digesting food
conservation	taking care of our environment by managing its resources
domesticated	a plant that has been cultivated or an animal that has been bred for human use
elliptical	oval-shaped

VOCABULARY

endangered	the name given to a species of plant or animal whose numbers are decreasing rapidly and that are threatened with extinction by natural or man-made changes in the environment
extinction	the condition when a species of plant or animal ceases to exist (California condors are threatened with extinction.)
fertilization	the act by which a sperm cell and egg cell unite to form an embryo
foraging	looking or searching for food; deer forage wooded areas for plants they can eat
gestation period	the amount of time a female carries developing offspring in utero before birth; the human gestation period is nine months
herd	a large group of animals, usually hoofed, that band together for survival
instinct	a kind of behavior that animals are born with; a strong natural impulse
in-vitro fertilization	fertilization of an egg cell by a sperm cell in a test tube, outside of a living animal
genetic diversity	the occurrence of different forms of inherited traits in a population (blue, green, gray, and brown eyes); identical twins do not have any genetic diversity because all their genes are identical; a group of students has a lot of genetic diversity because they are unrelated
leukemia	a blood disease that causes an increase in the number of white blood cells in the blood and bone marrow
mammal	animals that are covered with hair and give birth to live young that they nurse with milk
native habitat	an animal's or plant's naturally occurring environment, which has not been changed by humans

VOCABULARY

nicotine	an addictive chemical found in the tobacco plant, used in cigarettes and cigars
nocturnal	active mainly at night
population	a group of animals of the same species that are breeding
predator	an animal that lives by hunting, killing, and eating other animals
prey	an animal that is hunted, killed, and eaten by other animals
resin	a yellowish or brown thick liquid found in plants
sap	the watery fluid, carrying nutrients, that circulates through a plant
sedative	a calming drug that reduces excitement
species	a group of plants or animals that can reproduce with each other
Species Survival Plan	a program, created by the Association of Zoos and Aquariums, for managing captive populations of endangered animals
terrain	the physical appearance of an area of land; mountains, deserts, and plains are kinds of terrains
territory	the area of land that an animal or a group of animals of the same species uses to search for food and to raise its young. The animal or group of animals defends this land from intruders
venereal disease	a contagious disease mainly affecting the reproductive system

LEADER OF THE PACK

You are a male gray wolf leading a pack of five other wolves in a cold winter in northern Minnesota. As the leader of the pack (the "alpha male"), the decisions you make could mean life or death for you and the other wolves.

Can you lead your pack on a successful hunt? To find out, read the following paragraph. Pick one of the choices listed below it and follow the directions to the next paragraph. Good luck!

1. It has been five days since your pack has last eaten. You walk up onto the hill where the other wolves are sleeping and begin to howl, letting them know it is time to hunt. Your packmates jump up from their sleep and, hearing you, begin to howl too.

   You howl for a few minutes longer. **Go to 2.**
   You lead them out on a hunt **Go to 5.**

2. The noise of all the wolves in your pack carries a long distance. Far away, you hear another group of wolves howling back. They are in your territory!

   The last five winters have been very harsh. Only a few deer and moose—animals that you prey on—have survived. This new pack of wolves must have moved out of their own territory into yours to look for food.

   You decide to investigate. **Go to 3.**
   You ignore the calls of the other pack. **Go to 9.**

3. You howl a threat at the distant wolf pack and lead your pack out to find them and drive them away. You run through the snow-covered pine forest to where you heard them. There they are, seven other hungry wolves!

   You try to drive them away. **Go to 4.**
   You hesitate to see what they will do. **Go to 11.**

4. You single out the other pack's alpha male and leap at him. Behind you, the packs attack each other! After a furious struggle, you badly wound the other alpha male. He runs away, and his pack follows him. You have won!

   You want to rest. **Go to 13.**
   You want to hunt now. **Go to 5.**

LEADER OF THE PACK

5. You leap down the hill, and the other wolves follow. You search until you find the scents of animals that you hunt. The animals left tracks in the snow, but you hunt by following their smell more than by following their hoofprints. One of the scents belongs to a moose. The others were left by deer. All the scents are fresh.

   You follow the one deer that headed north. **Go to 10.**
   You follow the moose. **Go to 6.**
   You follow the herd of deer that went south. **Go to 8.**

6. The moose is big and will be harder to kill than a deer, but its scent is very fresh, so you lead the pack after it. After a short time, you catch up to it in a clearing. Trouble! It's a big male, and he might hurt you or a member of your pack with a well-placed kick.

   You leave the moose and go after the one deer that headed north. **Go to 14.**
   You try to bring down the moose. **Go to 7.**
   You follow the scent of the herd of deer moving south. **Go to 12**

7. If you let this moose go, it may be days before you find another animal big enough to feed your pack. As you lead the wolves against the moose, it gives you a powerful kick and hurts your leg very badly. You yelp in pain and fall to the ground.

   You are too hurt to walk. After sniffing your wound and whimpering, the other wolves hesitate and then leave you alone in the cold, deep snow. You will not survive very long. The end.

8. You leave the moose alone and set off after the herd of deer. You discover them several hours later in a dense grove of pine trees. They see you and begin to run. After a brief hunt, you bring down a deer in the first year of its life (called a "yearling"). It is a small meal, but it will allow you and your pack to survive until the next hunt. The end.

9. Those wolves are in your territory, but for now they are far away, and your pack needs to eat. You stop howling and lead your pack on a hunt. You search for signs of prey and discover the familiar scent of deer, a favorite prey of hungry wolves like you. But the scent is old. The deer must be a long way off.

   You follow the trail of this deer's tracks and scent. **Go to 10.**
   You continue looking for prey. **Go to 5.**

LEADER OF THE PACK

10. You follow the deer's scent through the forest. After several hours you sight it in a clearing. It's an adult male, or buck, old, and not very healthy. The deer runs away from you, but the deep snow and its poor health slow it down. You and the pack catch up to it and bring it down quickly. You will stay here for a few days until the deer has been completely devoured. But then you will have to hunt again, and you may not be lucky enough next time to find such easy prey. The end.

11. The alpha male of the other pack is threatening you! You bare your teeth at him and flatten your ears back against your head. You are angry but also afraid. He is bigger and probably stronger than you.

    The alpha male attacks you and the two packs collide in a whirl of fur and snow. You are very badly wounded, and your pack is scattered. You are left to defend yourself against all seven of the enemy wolves. As they close in, you snarl at them, determined to fight to the last. The end.

12. You follow the scent left by the deer. They are a short distance away, on the other side of a wide frozen river. But as you cross the snow-covered ice, they catch your scent, look up, and see you. By the time you and the pack reach the other side, they have escaped into the forest. There will be no meal for you and your hungry pack now. The end.

13. You and your mate, the alpha female, find a cozy spot under a fallen tree. The other pack members rest nearby, licking their wounds. Your hunt will have to wait for another day. Lack of food and the intense struggle have left you too tired to hunt for now. The end.

14. You try to follow the scent of the deer, but the scent is very old and not strong enough for you to sniff out. After several hours, you lose the trail and give up. Maybe tomorrow will bring better luck, but for now you and the other wolves will go hungry again. The end.

PUMA

Background for the Teacher: Pumas

Sleek and agile, the people-shy puma has been called the mammal most characteristic of the Americas—large, rugged, and free. Adaptable to almost any terrain, this cat once ranged from Canada to South America and has many names: mountain lion, American lion, cougar, panther, and catamount ("cat of the mountains"). Whatever you call it, whether it is winding through a rocky ravine, prowling a snow-capped mountain, or slipping through the steamy Everglades, the puma hunts with a supple grace.

What makes the puma such a proficient predator? Furred feet permit a soft, quiet tread for stalking. Long hind limbs propel its lean muscular body into amazing leaps to spring upon its prey. This cat's forelimbs are armed with five long, curved claws to grasp prey or rip at an enemy. Although they have few teeth compared to other meat eaters, their teeth are highly specialized, designed to seize, kill, and devour other animals far larger than themselves. Even the surface of the tongue is covered with sharp points that rasp meat from bones. This solitary hunter usually hunts at night, its tawny coat camouflaging it from prey.

Today the puma is found in significant numbers only in the western part of the United States. The Eastern Cougar is now extinct, and the Florida panther is critically endangered. How is this possible with an animal that is so adaptable to varying climates and terrain?

Zoo News: A small, threatened group of pumas, known as the Florida panthers, exist in the Florida Everglades. Fewer than 50 panthers survive. Researchers at the National Zoo's Center for New Opportunities in Animal Health Sciences (NOAHS) are now using assisted reproduction for the first time to save the Florida panther from extinction and to expand the available gene pool for this endangered cat. Scientists also are trying to recover and preserve sperm and ovaries taken from Florida panthers killed by cars.

PUMAS

Puma Facts

- Adult males weigh 148 to 227 pounds and measure five-and-a-half to six feet from nose to tail tip.
- Breeding is not confined to any one season. A pair will remain together for two weeks, perhaps longer. Then they part, possibly never to meet again.
- The mother rears the young alone, and the father plays no further role in the family. One to six spotted kittens are born after a 90-day gestation period.
- A young female panther will ordinarily not breed until she has established her territory. She can better provide food for her offspring when she is on familiar ground.
- Helpless at first, a puma cub grows rapidly as the mother brings meat to it and nurses it with her milk.
- Young pumas possess certain instinctive abilities as predators. But they still have a lot to learn about hunting. Before going out on their own, they will spend up to two years with their mother learning other skills necessary for survival.
- When it leaves its mother, the puma leads the life of a strict loner, hunting mainly at night for its prey.
- Unlike the lion, which roars, the puma purrs and makes high-pitched shrill sounds similar to the sounds a house cat makes, but louder.

IT'S A TOUGH WORLD IN THE WILD!

OBJECTIVE:

To show the ways habitat loss and human activity can affect the behavior of a wild animal. In the case of the Florida panther, continuing loss of habitat has caused many problems that have led the species toward extinction.

ACTIVITY:

1. Make a spinner using the pieces on the following page. Cut out the title box (including the arrow) and glue it across the top of a large rectangular piece of poster board (at least 9" x 12"). Then cut out the pie chart and glue it to a corresponding circle of poster board. Following the configuration on the next page, attach the pie chart loosely to the rectangular poster board using a brass paper fastener through its center. Make sure it can spin freely.

2. Direct the students to take turns using the spinner and ask them to determine the various influences causing each outcome. Choices should include:

   a. Habitat loss due to human activity

      - Less space for Florida panthers
      - Less space for prey of Florida panthers

   b. Direct human contact

   c. Indirect human contact

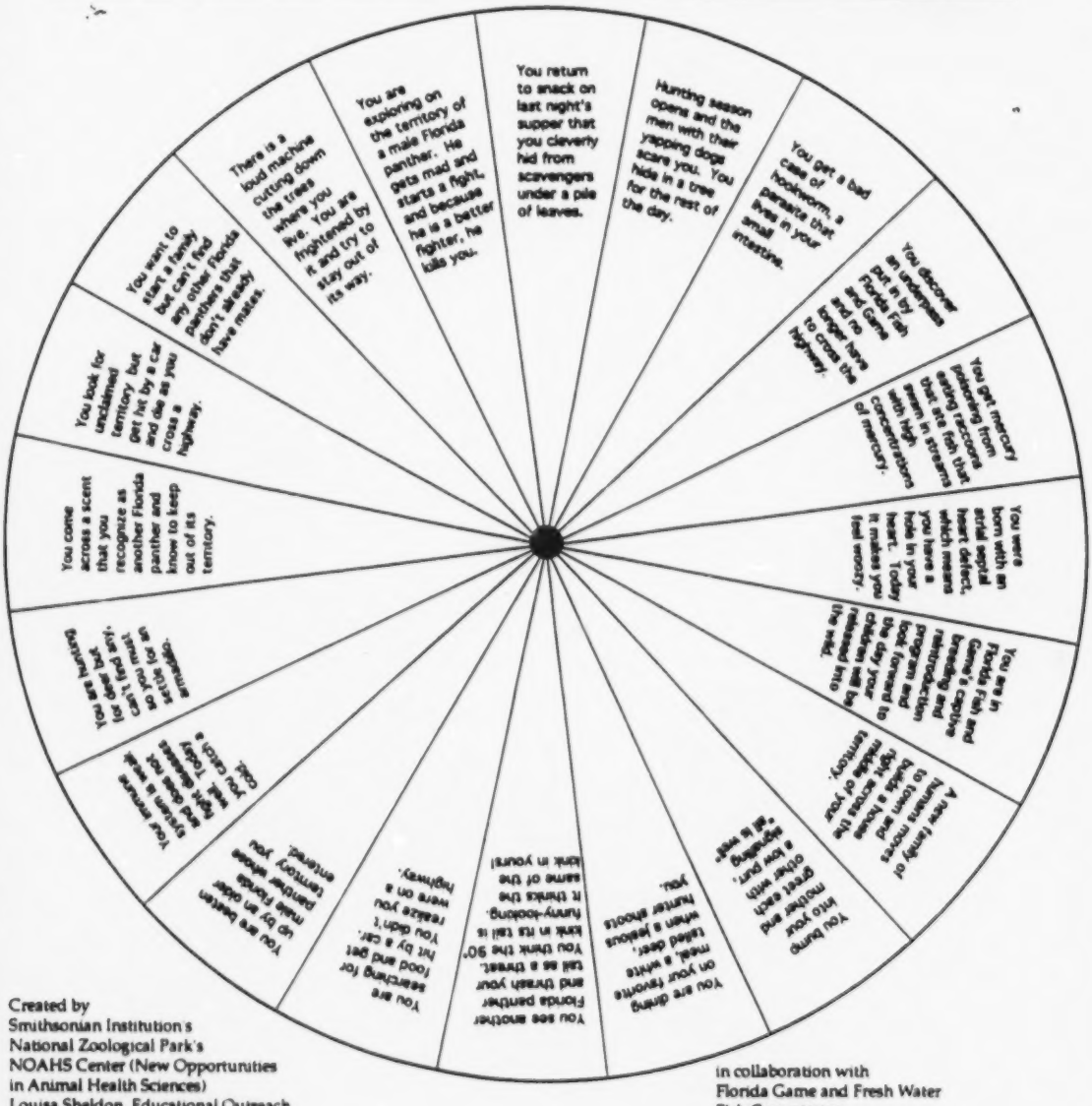
   d. Natural behavior

   e. Inbreeding

Some situations involve more than one influence.

IT'S A TOUGH WORLD IN THE WILD!

The swamps of Florida hold many perils for young Florida panther cubs, especially now that humans are using more and more of the land. Imagine that you are a young Florida panther cub leaving your mother for the first time to strike out on your own. These are some of the encounters you could experience on any given day. Spin the wheel to determine which will happen to you.


You return to snack on last night's supper that you cleverly hid from scavengers under a pile of leaves.
Hunting season opens and the men with their yapping dogs scare you. You hide in a tree for the rest of the day.
You get a bad case of hookworm, a parasite that lives in your small intestine.
You discover an underpass put in by Florida Fish and Game and no longer have to cross the highway.
You get mercury poisoning from eating raccoons that live in streams with high concentrations of mercury.
You were born with an atrial septal heart defect, which means you have a hole in your heart. Today it makes you feel woozy.
You are in Florida Fish and Game's captive breeding and reintroduction program and look forward to the day your children will be released into the wild.
A new family of humans moves to town and builds a house right across the street from your mother and other panthers. A low hum, spinning "all is well."
You bump into your mother each other with a loud
You see another Florida panther and thrash your tail as a threat. You think the 90° kink in its tail is funny-looking. It thinks the same of the kink in yours!
You are chasing a tasty meal, a white-tailed deer, when a jealous hunter shoots you.
You are searching for food and get hit by a car. You didn't realize you were on a highway.
You are lucky enough to by an older male Florida panther enter your territory. You are scared, but also excited.
Your mother is ready to teach you how to catch a deer. You pay attention carefully.
You are hunting but can't find any. You're not sure why.
You come across a scent that you recognize as another Florida panther and know to keep out of its territory.
You look for unclaimed territory but get hit by a car and die as you cross a highway.
You want to start a family but can't find any other Florida panthers that don't already have mates.
There is a loud machine cutting down the trees where you live. You are frightened by it and try to stay out of its way.
You are exploring on the territory of a male Florida panther. He gets mad and starts a fight, and because he is a better fighter, he kills you.

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Mike Dunbar, Panther Veterinarian

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IT'S A TOUGH WORLD IN THE WILD!

ANSWERS AND EXPLANATIONS

You are searching for food and get hit by a car. You didn't realize you were on a highway.

Habitat loss, direct human contact. Many Florida panthers were killed in highway accidents because humans did not realize that the highways they were building went right through some of the most traveled habitat of the Florida panther.

You are beaten up by an older male Florida panther whose territory you entered.

Habitat loss. There is so little land left for the Florida panther that they must fight for the space that remains.

Your immune system is weak and does not fight diseases well. Today you catch a cold.

Inbreeding. Because the population of Florida panthers has decreased, they are forced to breed with closely related individuals. This can cause many health problems, such as a weakened immune system.

You are dining on your favorite meal, a white-tailed deer, when a jealous hunter shoots you.

Direct human contact. Shooting Florida panthers is now illegal, although in the past, the United States government did sponsor programs to wipe out all predators. However, some animals are still killed illegally every year.

You get mercury poisoning from eating raccoons that ate fish that swam in streams with high concentrations of mercury.

Indirect human contact (pollution). Because Florida panthers are top predators on the food chain, they are subject to the buildup of toxins like mercury. It is likely that these toxins occur in nature in higher concentrations than normal due to human activity.

You look for unclaimed territory but get hit by a car and die as you cross a highway.

Habitat loss, direct human contact. Highway accidents were once one of the major causes of death for the Florida panther.

IT'S A TOUGH WORLD IN THE WILD!

You want to start a family but can't find any other Florida panthers that don't already have mates.

Habitat loss. There are now so few Florida panthers left that the ones that remain must struggle to find not only food and space, but also mates.

There is a loud machine cutting down the trees where you live. You are frightened by it and try to stay out of its way.

Direct human contact. Panthers have a reputation for being shy and retiring and will generally try to avoid humans.

You are exploring on the territory of a male Florida panther. He gets mad and starts a fight, and because he is a better fighter, he kills you.

Habitat loss. Because so much habitat is being lost to humans, Florida panthers are coming into contact with one another more often than they would normally. Territorial conflicts are now the leading cause of death in young male Florida panthers.

You return to snack on last night's supper that you cleverly hid from scavengers under a pile of leaves.

Natural behavior.

Hunting season opens and the men with their yapping dogs scare you. You hide in a tree for the rest of the day.

Direct human contact. Because panthers are so shy, they are easily driven into trees. In the past, using aggressive, barking hunting dogs to tree panthers was a very effective means of capture.

You get a bad case of hookworm, a parasite that lives in your small intestine.

Habitat loss. Hookworm and other parasites spend a part of their life cycle living off the wastes of other animals. Because Florida panthers have less space to live in, it is more likely that they will come into contact with these parasites.

You discover an underpass put in by Florida Fish and Game and no longer have to cross the highway.

Indirect human contact. Because so many highway deaths were occurring, Florida Fish and Game constructed underpasses at the sites that were being used most frequently to cross the highway. The number of highway deaths has since decreased.

IT'S A TOUGH WORLD IN THE WILD!

You come across a scent that you recognize as another Florida panther and know to keep out of its territory.

Natural behavior. However, as available land is used by humans, this type of encounter would become more common.

You were born with an atrial septal defect, which means you have a hole in your heart. Today it makes you feel woozy.

Inbreeding. When closely related animals mate, a host of reproductive and health-related problems may occur. This is one that occurs in Florida panthers.

You are captured by Florida Fish and Game to become part of their captive breeding and reintroduction program.

Direct human contact. Florida Fish and Game has started a captive breeding and reintroduction program in order to help maintain a genetically healthy population. If more than one cub is present in a litter, one may be captured to use in this program.

A new family of humans moves to town and builds a house right across the middle of your territory.

Habitat loss, direct human contact. When a territory is cut in half because of human activity, a panther will have more difficulty hunting for food and will have more hostile encounters with other panthers.

You are hunting for deer but can't find any, so you must settle for an armadillo.

Habitat loss. Loss of habitat affects not only Florida panthers but also their preferred prey. With fewer white-tailed deer available, Florida panthers switch to second-rate prey such as raccoons, armadillo, and alligators.

You eat a wild hog and catch pseudorabies from it.

Natural behavior. Eating infected prey is one of the risks a predator must face.

You see another Florida panther and thrash your tail as a threat. You think the 90° kink in its tail is funny looking. It thinks the same of the kink in yours!

Inbreeding. Skeletal abnormalities are one of the problems that can occur when closely related individuals mate. In the Florida panther population, the frequency of kinked tails is greater than in other panther subspecies, which indicates that Florida panthers are more closely related than would be expected in a normal population.

BLACK-FOOTED FERRET

Background for the Teacher: Black-footed Ferrets

You probably have never seen a black-footed ferret. The only ferret native to North America, the black-footed ferret numbered one million in the West before the turn of the century, with populations stretching from Canada into Mexico. Despite being hunted by coyotes, bobcats, eagles, and falcons, the ferret thrived until the wilderness areas in which it lives were disturbed by humans. Now they are one of the most critically endangered mammal species in North America and one of the rarest mammals in the world.

You might be lucky enough to see a black-footed ferret someday, if the animal makes a comeback in its native habitat—the prairies of the western United States. How will you recognize a black-footed ferret? It is about the size of a squirrel and has a grayish white coat. As its name suggests, it has black fur on its paws. Cattle ranchers liked to call it "the bandit of the prairie" because of the black "mask" that circles its eyes.

Until a small population was recently discovered in Wyoming, the black-footed ferret was believed to be extinct. In 1985, only 18 remained! Scientists who specialize in "species survival" at the Smithsonian Institution's National Zoological Park's Conservation and Research Center in Front Royal, Virginia, and elsewhere began to closely study the black-footed ferret's behavior in captivity and in the wild.

The results of these studies are now being used to devise several breeding plans. Scientists at the Zoo's New Opportunities in Animal Health Sciences Center (NOAHS) employ a technique called "artificial insemination" to enhance the ferrets' reproduction. Because genetic diversity gives animals their best chance for survival, researchers are careful to mate the most distantly related ferrets. The NOAHS Center helped four ferret mothers at the Sybille Wildlife Research Center in Wyoming give birth to kits. Today about 400 ferrets have been bred in captivity nationwide.

As many as 50 black-footed ferrets were reintroduced to the Wyoming wild last year, but

their survival remains a daily struggle. Researchers have discovered that by the time a young ferret is ready to strike out on its own, it needs to have learned survival skills such as hunting, foraging, and escaping from predators. Black-footed ferrets born in captivity are learning all they can from their mothers and have help from species survival specialists.

Prairie dog burrows provide the black-footed ferret with shelter from its natural predators. In addition, these tunnels are the home of its favorite prey, the prairie dog. The dwindling prairie dog population, eradicated primarily by humans, is the principle reason the black-footed ferret is threatened with extinction today. Two other factors combined recently to further threaten the ferrets. Canine distemper, a disease found in domestic dogs, is 100 percent fatal to ferrets. Another disease, sylvatic plague, has greatly reduced the prairie dog population.

In the following activity, students can learn many of the factors that have threatened the black-footed ferret with extinction.

GO FERRET!

Objective:

With this card game, you can pretend to be a black-footed ferret going about the business of survival. To survive, you must depend on your ability to breed successfully in captivity and stay out of harm's way in the wild. Are you swift enough to escape predators who'd like to eat you? Can you escape a deadly disease that threatens to wipe out your whole family?

Directions:

The game involves two types of cards. The first type is marked with an E for extinction, and the second type is marked with an S for survival. To start the game, deal five cards to each player. The aim of the game is to get five S cards and to get rid of all your E cards. Start to the left of the dealer. Each player takes a turn, discarding one E card from your hand and picking another card from the deck placed in the center of the table. The first player to get five S cards and shout "go ferret!" wins the game.

Note to the teacher:

The following pages contain the patterns for the cards. Make seven copies of the E card page and three copies of the S card page. Mount the pages on cardboard, and cut out the cards.

EXTINCTION CARDS

You've been bred in captivity but learned nothing your mother taught you about hunting prey. You'd better learn quickly.

Your prairie dog prey is poisoned by traps set by humans. No dinner tonight.

An epidemic of sylvatic plague wipes out the remaining prairie dog population. No dinner forever.

Canine distemper hits your whole ferret family. Your own survival is doubtful.

You fail to breed with other ferrets in captivity. You have no offspring to reintroduce to your old prairie homeland.

A hungry falcon swoops down on you, eating you for breakfast before you have a chance to hide in an underground burrow.

BEST COPY AVAILABLE

SURVIVAL CARDS

S

You are one of the few black-footed ferrets in South Dakota. Congratulations. You are among the last survivors of your species.

S

You breed successfully in captivity. Your litter of three increases the ferret population.

S

Hunting skills learned from your mother pay off when you catch a tasty prairie dog.

S

Prairie dogs, rabbits, and mice are everywhere. There's plenty of food for supper.

S

A hungry coyote is chasing you down, but you swiftly escape into the safety of an underground prairie dog burrow.

S

A kindly cattle rancher, knowing you eat prairie dogs, has allowed them to dig burrows on his land. You have a good food supply.

Background for the Teacher:

The Native American Heritage Garden
at the National Zoological Park

Scientists are only now beginning to thoroughly study and understand what American Indian tribes have known for centuries about the healing abilities of certain kinds of plants. Below are four examples of plants with great medicinal value that have been used by American Indian tribes to treat many illnesses. These plants have been included in the Native American Heritage Garden at the National Zoological Park. The garden, built by the Friends of the National Zoo and many volunteers, shows how American Indians used these plants to treat a wide variety of ailments long before European settlers reached the continent.

Do not use these descriptions as guides for applying plants as medicinal cures. They are not to be used as guides for preparing or prescribing treatments. INCORRECT USE IS EXTREMELY DANGEROUS!

WITCH HAZEL

Range: A medium-sized family of trees and shrubs, witch hazel grows in damp woods from Canada's Nova Scotia south to Georgia and west to Nebraska.

Uses: For hundreds of years, Native Americans have used solutions pre paredfrom the bark and leaves of the witch hazel plant for treating cuts, insectbites, sores, and bruised eyes.

Modern science does not have an explanation for witch hazel's soothing properties. Nevertheless an extract of the plant is sold widely today as a skin freshener, a remedy for headaches, and a treatment for cuts. American Indians discovered the means of extracting the necessary elements from the bark and leaves of the plant and later taught the process to European settlers.

INDIAN TOBACCO

Range: Indian tobacco is not to be confused with the tobacco plant used to make cigarettes. Indian tobacco grows wild on roadsides and fields as far north as Saskatchewan, Canada, as far south as Georgia, Alabama, Mississippi, and Arkansas, and into eastern Kansas.

Uses: The Cherokee Indians were the first people to smoke Indian tobacco in order to cure nicotine dependence. Taking their cue from American Indians, scientists examined the plant and identified a chemical called lobeline as the ingredient that works against nicotine addiction. Lobeline is now used in some antismoking products.

Native Americans also found this plant useful in relieving asthma and other lung and breathing ailments.

Large doses of this plant are toxic.

WILD YAM

Range: This root, different from the sweet potato plant that we call a yam, grows in wet areas from Rhode Island to Florida and Texas.

Uses: The wild yam was employed by the Fox and Cherokee tribes to combat illnesses and discomforts long before it was discovered by Europe ans. These Native Americans found it helpful in treating diarrhea, urinary pain, unsettled nerves, nausea during pregnancy, and the pain of childbirth.

Wild yam, as it grows naturally, does contain toxins. Other elements of the plant form the basis of large number of drugs: contraceptive pills, hydrocortisone creams, arthritis medicines, steroids, and many others.

MAYAPPLE

Range: Mayapple is found from Florida to Texas, and from Quebec, Ontario to Minnesota and New England.

Uses: The Fox Indians used mayapple to treat snakebite, relieve constipation, and induce vomiting. It was found by the Penobscots to be useful in treating warts and skin cancer. Today, drugs based on chemicals found in mayapple are used to treat many forms of cancer including lymphoma, leukemia, and Kaposi's sarcoma (an AIDS-related disease). Extracts from mayapple also form a treatment for some kinds of lung cancer.

NEW MEDICINE FROM OLD WAY

Do not use these descriptions as guides for applying plants as medicinal cures. They are not to be used as guides for preparing or prescribing treatments. INCORRECT USE IS EXTREMELY DANGEROUS!

Materials: A pencil and a medicinal plant chart (located on the next page) listing the uses of four plants by Native Americans and by modern medical professionals.

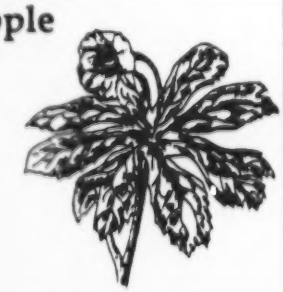
Directions: Using its initials, match the wild plant with its medical application: WH (witch hazel), WY (wild yam), MA (mayapple), and IT (Indian tobacco).

You are a researcher who has been studying the medicinal uses of various plants, particularly those used previously by American Indian tribes.

1. Members of the Cherokee tribe discovered that it relieved nicotine dependence. ____
2. Today, doctors use its extract in medicines for Kaposi's sarcoma. ____
3. Native Americans used it in a lotion for insect bites. ____
4. The Fox and Cherokee tribes used it as a treatment for urinary tract pain. ____
5. Healers in the Cherokee and Fox tribes used it to relieve nausea during pregnancy. ____
6. It is sold widely today for use as a skin freshener. ____
7. Today, doctors use it in arthritis medicines. ____
8. Members of the Fox tribe used it to treat snakebite. ____
9. It was used by the Fox and Cherokee tribes as a tonic to soothe the nerves. ____
10. Doctors use it as a treatment for cancer today. ____
11. Native American healers used it to relieve asthma symptoms. ____
12. Native Americans used it to help heal bruises, insect bites, and poison ivy rashes. ____
13. Penobscot tribe members used it to treat skin cancer. ____

Answers:
1. IT; 2. MA; 3. WH; 4. WY; 5. WY; 6. WH; 7. WY; 8. MA; 9. WY; 10. MA; 11. IT; 12. WH; 13. MA

NEW MEDICINE FROM OLD WAY

	Traditional Native American Uses	*Modern Medical Uses*
Witch Hazel	treating cuts, insect bites, sores, and bruised eyes.	skin freshener, remedy for headaches, and a treatment for cuts.
Indian Tobacco	curing nicotine dependence; relieving asthma and other lung and breathing ailments.	identified a chemical called lobeline as the ingredient that works against nicotine addiction. Lobeline is now used in some antismoking products.
Wild Yam	treating diarrhea, urinary pain, unsettled nerves, nausea during pregnancy, and the pain of childbirth.	contraceptive pills, hydrocortisone creams, arthritis medicines, and steroids.
Mayapple 	treating snakebite, relieving constipation, inducing vomiting, and treating warts and skin cancer.	lymphoma, leukemia, and Kaposi's sarcoma (an AIDS-related disease). Extracts from May apple also form a treatment for some kinds of lung cancer.

POSTVIEWING ACTIVITIES

1. Direct students to make attribute wheels using the pieces on the page 29. Students should work together in pairs to play a game in which they have to name an animal that fits the attributes the wheels land on. For instance, if the animal classification wheel lands on bird, the habitat wheel lands on desert, and the food wheel lands on carnivore, the student might say roadrunner.

2. After students research particular North American animals, ask them to each create one of the following:
   a. a fictional birth announcement for a baby animal telling where and when it was born and how it will be raised.
   b. a shopping list or menu for the animal including all the things it eats.
   c. a personal ad outlining the qualities of a mate.
   d. an ad for the real estate section of the paper telling about the type of home the animal would like to purchase.

3. Discuss famous American animals or American animals that have been used as subjects in art, music, or literature. Why and how have these animals became famous? Why was the animal chosen as the subject for the piece of art, music, or literature?

4. If your school has an animal mascot, direct students to investigate whether the animal is a native animal?

5. Ask students to investigate the origins and meanings of some animal sayings such as "blind as a bat," "wise as an owl," and "crazy like a fox." Ask students to discuss the "truth" of each saying.

6. After they investigate extinct or endangered North American animals, ask students to create timelines that show when the animals became extinct, endangered, or were taken off the endangered species list. (A good reference book for teachers is Lost Wild America, "The Story of Our Extinct and Vanishing Wildlife" by Robert M. McClung.)

6. Direct students to find out what people can do or are doing to help animals that are considered endangered. Students may want to explore ways in which they can become actively involved in these efforts.

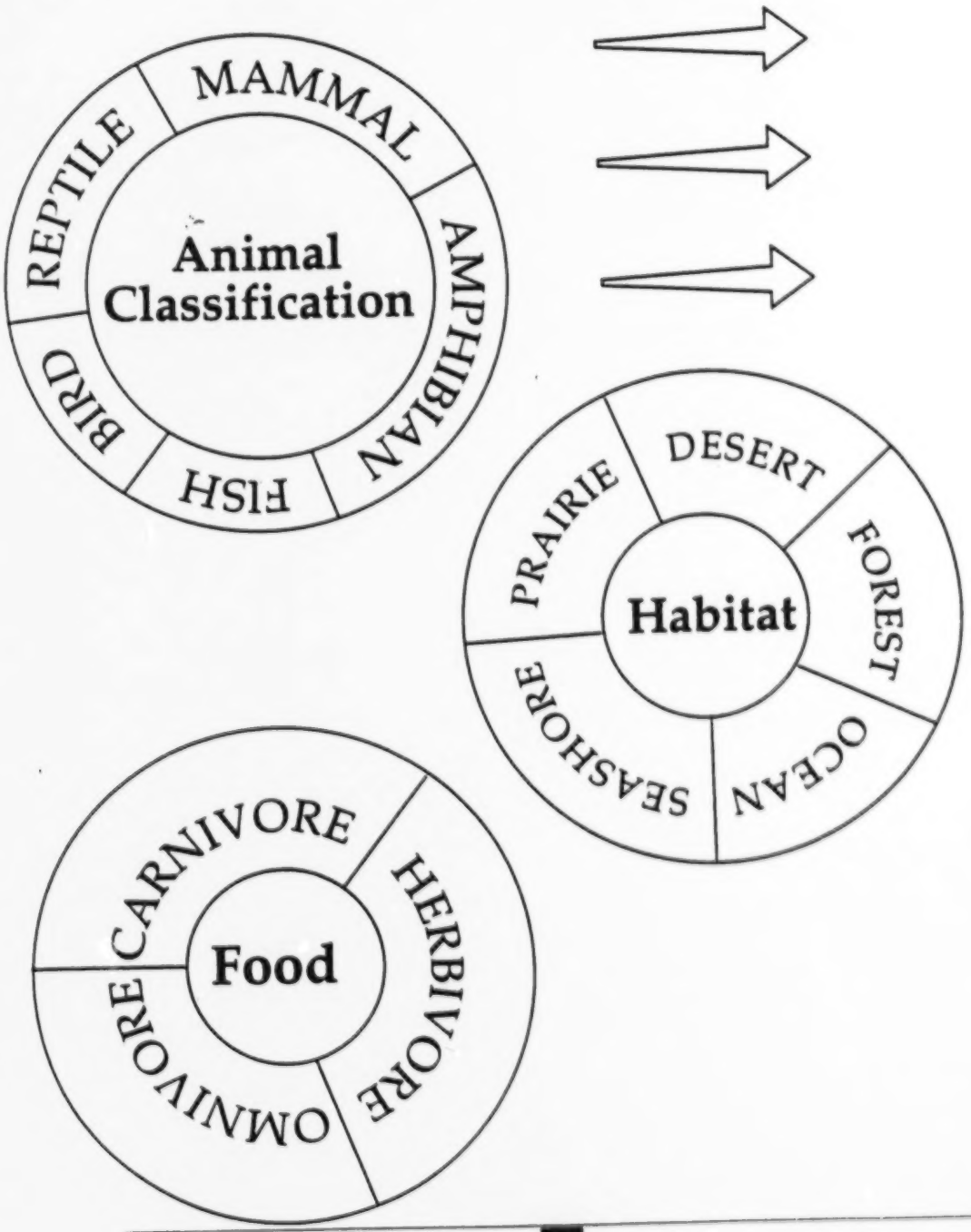
POSTVIEWING ACTIVITIES

7. You may want to ask students to write articles for the school or local newspaper describing some local wildlife problems and issues and ways that fellow schoolmates or neighbors can help.

8. Volunteering at a local wildlife center or park is a great way for students to become involved with animals that live close to home.

9. By contacting the National Wildlife Center, students can receive a information that outlines how they can create a backyard wildlife habitat at home or at school.

ATTRIBUTE WHEELS



RESOURCES

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RESOURCES

The following organizations have resource materials that are related to the **Science Safari** program, "Home on the Range."

Bat Conservation International
P. O. Box 162603
Austin, TX 78716-2603

Chesapeake Bay Foundation
1622 Prince George Street
Annapolis, MD 21401

Center for Marine Conservation
1725 DeSales Street, NW
Suite 500
Washington, DC 20036

International Crane Foundation
E-11376 Shady Lane Road
Baraboo, WI 53913-9778

National Geographic Society
Department 89
Educational Services
Washington, DC 20036

National Wildlife Federation
1400 16th Street, NW
Washington, DC 20036-2266

Save the Manatee Club
500 N. Maitland Avenue
Suite 210
Maitland, FL 32751

U.S. Fish and Wildlife Service
Section of Information Management
Patuxent Wildlife Research Center
Laurel, MD 20708

Virginia Wildlife Federation
4427 Braddock Road
Alexandria, VA 22312-1319

The Wildlife Center of Virginia
P.O. Box 98
Weyers Cave, VA 24486

World Wildlife Fund
Public Information
1250 24th Street, NW
Suite 400
Washington, DC 20037

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